

# CREATING A FIGURE ARMATURE FOR SCULPTURE

by **Setti Fine Art** on April 17, 2009

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## intro: CREATING A FIGURE ARMATURE FOR SCULPTURE

The armature is a fundamental part of the sculpture. In very basic terms it is the skeleton or support structure that will hold your clay as you sculpt the figure. It is important not to take short cuts or work hastily without proper planning, as this will result in much unnecessary frustration later on.

For beginners an armature can seem complicated and overwhelming not knowing where to begin. This is a simple system that works quite well and can make an armature in a relatively short amount of time (usually 30 minutes for a 12" armature!)

There are some clays out there that are self-supporting and therefore do not require the use of a support armature. These materials are clay/wax hybrids that are light in weight and fairly rigid when cool like Castilene, which will be covered in another segment.



### Image Notes

1. Example of a sculpture in the very beginning stages. Here you can clearly see how important the armature is to holding up the clay in your desired pose while you work. The armature also serves as a guide to follow when applying the clay much like a real skeleton.

## step 1: PROPORTIONS

Once you have established your scale you will need to establish what proportions to use. This will depend in large part with the type of character you will be sculpting; for example a male super hero will have different proportions when compared to an average adult male. In a similar fashion a male super hero will differ in proportion to a female super hero as female characters tend to look better with longer legs and shorter torsos than their male counterparts.

Also a child will be quite different in proportion to an adult & so on and so forth. Proportion can make a figure more or less heroic according to how many heads tall he/she is. For our purposes proportions are measured by using the head as the unit of measurement. From this unit we can find the measurements for the rest of the body. The average human being is 7 1/2 heads tall meaning that if you were to divide the person using the measurement of their head you would find that it would fit 7 1/2 times their body in height. From this there are other measurements that we can find but for the time being this is really the most important aspect you need to understand.

For sculpting you will find that 7 1/2 heads tall, although correct, can make a figure reduced to scale look a little dumpy. This is simply an illusion caused by the fact that you are sculpting something at a reduced scale from the real thing. This is especially true for female figures. In fact you can extend the legs on female figures a little to make sure they look graceful and elegant. In the end though proportion comes down to personal tastes so once you learn how proportion works you can then modify it to achieve the results that most appeal to you.



#### Image Notes

1. Wire armature: in this case the figure is 9" tall which is a typical scale for Anime and other smaller collectable figures.

## step 2: THE PROPORTION CHART

A proportion chart is very much like a map showing you where to go. It really makes your life a lot easier when building the armature and can be a very simple sketch like a basic stick figure. The main thing is that it be fairly accurate when it comes to the head proportions as mentioned previously. By creating this proportion chart you will relieve yourself of many headaches later on during the clay stage where mistakes in proportion caused by the armature become very difficult to fix. Things like the armature poking out of the hip area, or an arm being too short or too long, can all be avoided by laying out the armature over a proportion chart beforehand. Be patient with this step and take your time to get it right or it will make your sculpture a frustrating experience later on!

When you draw your proportion chart make sure you draw it the same size as the figure you intend to make. For example a 12" figure will require a 12" tall chart; an 18" figure will require an 18" tall chart, so on and so forth. You will need to lay down the armature wire over this chart so it is important that the chart be of the correct size.

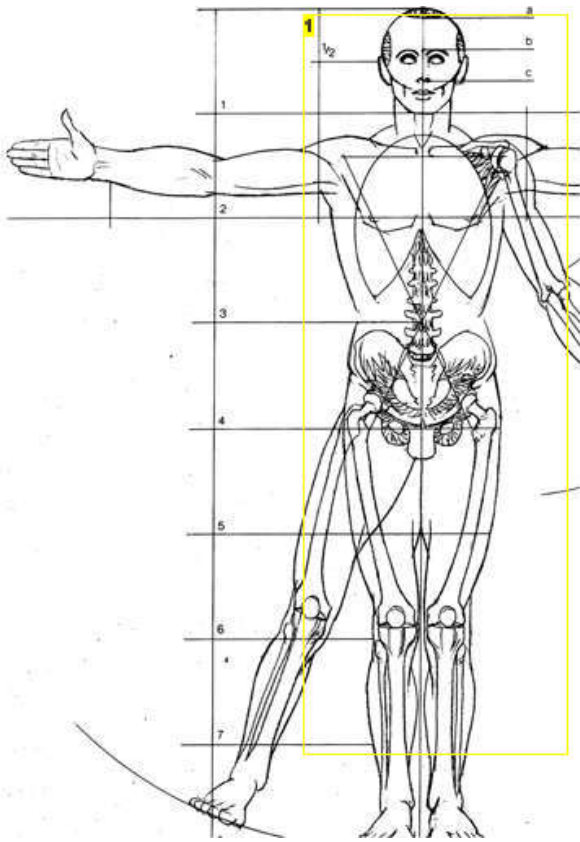
Follow the chart below [see photo] to help you draw your own. Alternatively you could search the net for a proportion chart with equal results. Then simply scale the chart to the correct size (using photo editing software or a photocopier).

For this example we are going to use a proportion of 8 heads tall. This will keep our figure more realistic but not dumpy or too elongated. If you wanted to create a more heroic figure, like a larger than life super hero, then 9 heads (or more) would be even better.

One last thing to mention is that you should make (or find) a proportion chart for a female figure and one for a male figure, as the body structure between the two genders is not the same. If you were to use a male chart for a female figure often you would find that your girl would look a little on the manly side (having wider shoulders and a narrow hip area) when in fact you would want the opposite (females have wider hips and narrower shoulders than men). It helps if you treat male and female figures as though there were two entirely different creatures to ensure you have men that are manly and women that are feminine and graceful. It is good to have a very different mindset when approaching each individual gender.

#### WHAT YOU WILL NEED:

- 1/8th aluminium armature wire
- 1/16th aluminium armature wire
- Small gauge galvanized steel wire (18 gauge or thinner is best)
- Wire cutters
- Pliers
- Apoxie putty (Aves Studio)
- A base made from plywood or similar
- A Marker (Sharpie)



#### Image Notes

1. Example of a male proportion chart. In this case the figure is divided by 8 heads. Basically the head size fits 8 times within the height of the body. This is a really balanced proportion and one I use most frequently for my work.

### step 3: PLANNING THE ARMATURE

In this step I'm going to explain the process of making an armature to use as your framework for applying clay to flesh out the actual sculpture. In this case I am using a female figure for this tutorial but this method works for any type of figure that has human (or human-like) physiognomy.

The armature requires a bit of planning, time and patience in order to make correctly but is really not that difficult once you know the process. The wire we are using for the main structure of the armature is going to be the 1/8th thick armature wire because it is strong enough to support the weight of the clay while at the same time is malleable enough to be easily bent into shape not to mention straightforward to cut with wire cutters or a hack saw later on to divide the sculpture.

You sometimes hear about using metal coat hangers you get from the dry clear instead of aluminium armature wire because it is cheap and readily available. Its true that if you really have no other choice then a metal hanger is fine but it is strongly advised against using it because it can be really difficult to work with and is more of a nuisance then anything in the end and definitely not easy to cut apart once your model is finished. Sometimes what is cheaper is not necessarily better!

It is vital that the armature is correctly proportioned and sturdy enough to hold-up your clay and not move around while you work (or flop over!) while allowing you to make pose adjustments later on.

Basically if your armature is incorrect, or disproportioned, then the whole sculpture will be out of whack from the get go and you will have an extremely frustrating time making it work. An armature that is properly constructed will actually aid you during sculpting while a poorly made one will make you want to quit or, in some cases, cause you to throw your work against a wall (this is not recommended of course!).

You can often dictate, based on the armature, how well your sculpture will look the end. I noticed that many beginners tend to overlook this stage only to find themselves with major headaches later on during the sculpting phase.

Bottom line: make sure you make your armature properly: it's worth the effort!

Once I have decided on a character and pose that I want to sculpt I have to decide at what scale I'd like to make the sculpture. In this case I will make a female figure 12" tall (roughly 1/6th scale). Because she is a realistic figure I am using a template I found in a book that is suitable for this type of human figure (a proportion of 8 heads tall roughly).

You wouldn't want to use a template with irregular human or cartoon proportions on this piece, as it wouldn't look right. In fact proportion has a lot of influence on how you want your character to be perceived by the observer and should be carefully considered before making the armature. There are many books that cover proportion and its affects (like "Drawing the Marvel Way") so I won't be touching upon that here.

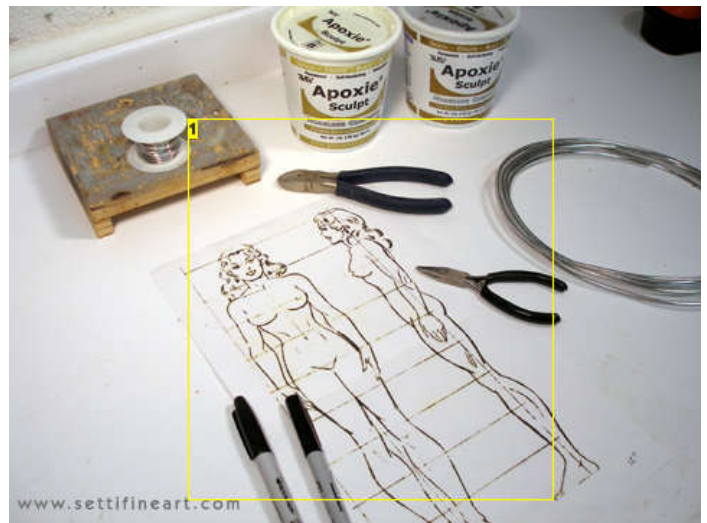
Once I have my template, I carefully re-size it to the measurement (I use Photoshop but a similar imaging editor will work too or you can use a photocopying machine) I want my final sculpture to be, in this case, 12" tall (from head to feet). I then select a suitable armature wire size which, in this case I used 1/8th armature wire (available at most art stores), but you could even use 1/16th armature wire braided together as well (which ends up being 1/8th thick).

The main thing you want to look at is that the armature provides enough support for the modelling process but, at the same time, won't be too large to poke out or not allow for enough material to be laid onto it. The biggest concern for me is making sure it won't deform too easily when I'm applying clay: there is nothing more frustrating then a wobbly armature!



#### Image Notes

1. An example of a 24" female figure in the finale stages of detailing. In this case the figure was cast in resin and final detailing was created with Apoxie Sculpt by Aves Studio.



#### Image Notes

1. Tools and set-up required for making an armature. Note the proportion chart printed to scale of what the final figure will be. In this case 12" tall.

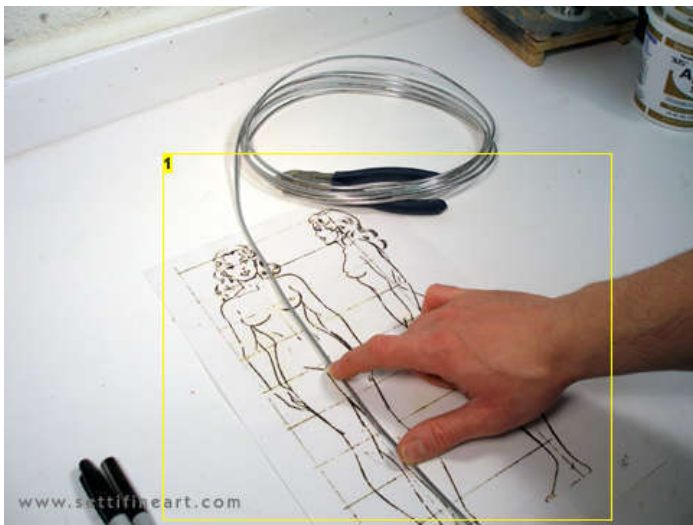
### step 4: MAKING THE ARMATURE PIECES

Once I've selected my wire I carefully lay it over my template. I then proceed to mark the joints (like elbows, shoulders, knees, bottom of feet, etc.) with a Sharpie and then carefully bend it according to my guide (make sure you don't miss this marking step as it will be important later on for posing!).

I make sure I leave at least 1" of length at the bottom of the feet so I can embed the armature into a piece of wood later on: this will serve as a stable base for sculpting. I use one piece of wire, bent accordingly, for the legs, torso and arms (I make two of these). I then use a single length of wire for the spine/neck/head area (see photo).

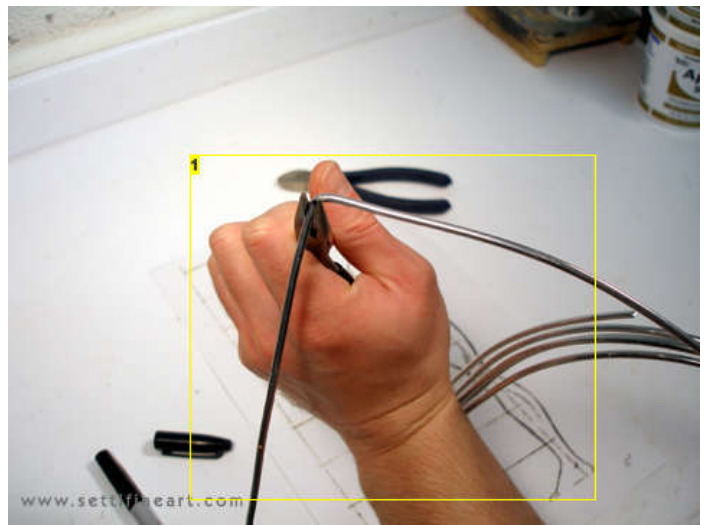
Once I am satisfied with my pieces I then take a fine gauge wire (available from most hardware stores) and carefully wrap the three pieces together. I do my best to wrap them fairly tight so they won't move around on me too much. It's OK if they move a round a little bit as we will set them in place later on. The main thing is that the pieces don't come apart or become too loose.

At this stage the armature won't necessarily reflect the pose of my reference material: that is OK! I'm going to make the pose adjustments later on. It is important that you lay down your armature onto a frontal orthographic view or you could end up with distortions later on. Once you have a good solid armature that is orthographic and balanced then the posing can be done after. As you will see we are going to set up the armature so that the posing will be easier while sculpting.



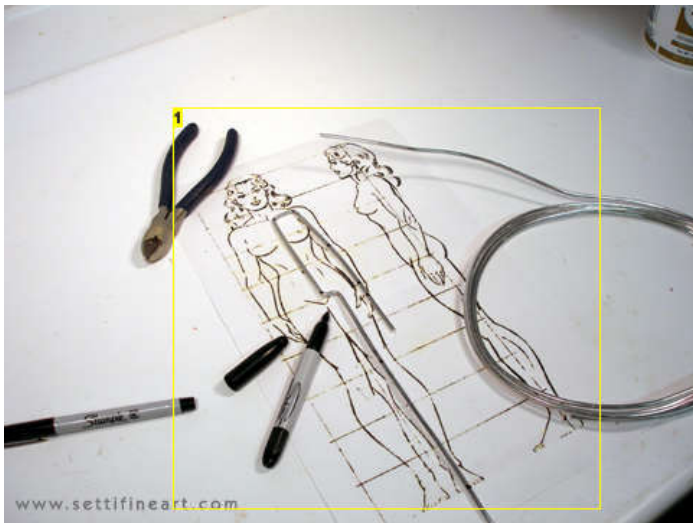
**Image Notes**

1. Laying down 1/8th gauge aluminium armature wire over the chart using it as a template.



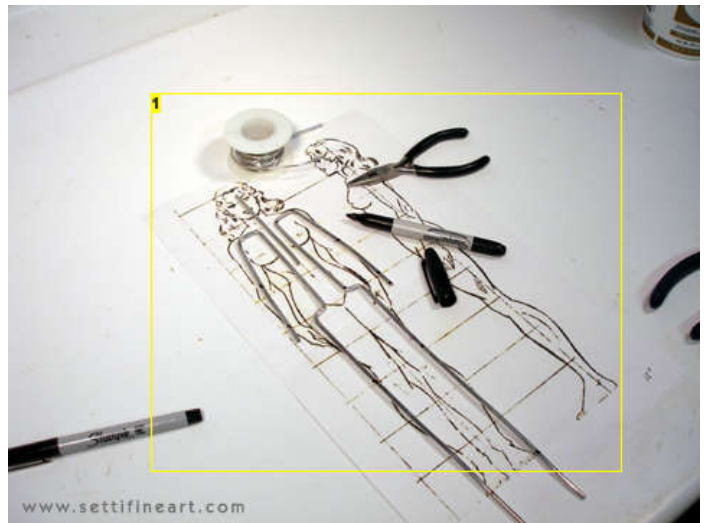
**Image Notes**

1. Bending the wire using pliers to achieve a correct bend. Bending wire without a hard edge can cause it to bend where you don't want it to making your armature out of whack.



**Image Notes**

1. One half of the armature. Note the markings where the major joints are like the elbows and knees. This will help determine where to make bends later on for posing.



**Image Notes**

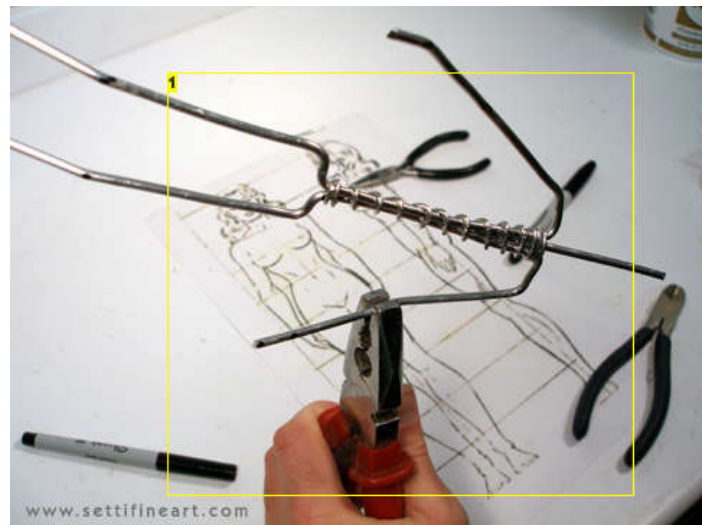
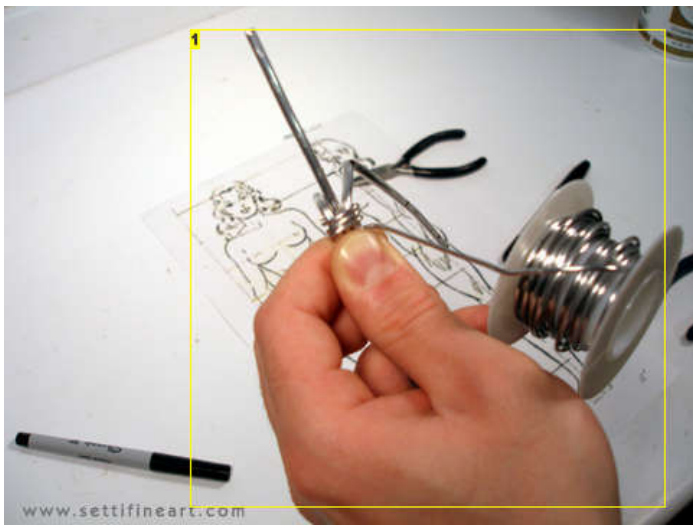
1. Armature parts completed and ready to be fastened together. As you can see each side is a mirror image of the other with a single piece of wire making up the spine.

**step 5: FIXING AND MOUNTING THE PARTS**

Now I have my armature together in a temporary fashion, but sturdy enough to allow me to mount it onto the wooden base, I carefully try to pose my piece so that it is close to my reference art as possible. Make sure you use pliers placed on your marked joints to make the bends (you want them to be crisp!) because if you try to bend them simply with your fingers you won't have a hard edge to serve as leverage and you will end up with "spaghetti" looking limbs.

Remember that your real joints bend at specific points (remember those marks you made with the Sharpie?!) so you want to make sure you are bending your wire in a similar fashion and NOT like a wet noodle (unless you are sculpting Rubber-man of course).

Once I'm satisfied with my pose (or close enough: I can always tweak it later on), I mark my piece of wood with a Sharpie where the foot pegs will go (I do this by placing my armature over my piece of wood in the approximate pose). I then take my trusty drill and make my holes using a 1/8th drill bit (the same size as my armature wire). If you have access to a drill press then that is better as your holes will be at right angles. A regular hand drill works great too though!

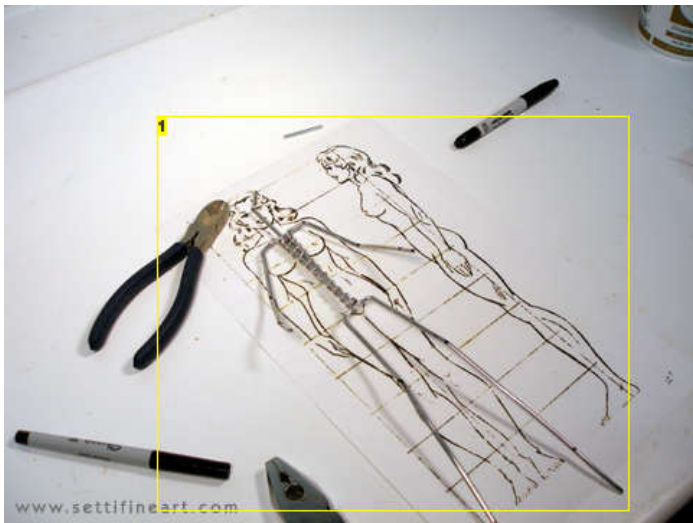


**Image Notes**

1. Using thin gauge wire to wrap around the pieces fastening the armature together.

**Image Notes**

1. Making slight preliminary bends on the major joint areas. This helps to visualize where the front and back of the figure are.



**Image Notes**

1. Completed armature minus Apoxie putty. Note how I have left at least 1" length at the bottom, below the markings for the feet: this will allow us to mount the armature onto a wooden base.



**Image Notes**

1. Completed armature mounted on base awaiting Apoxie putty. Notice I have wrapped very thin gauge wire over the arms and legs: these will serve as anchors for the clay allowing it to better adhere and not slip off. Without this the clay has a tendency to slip and slide.

**step 6: FINAL STEPS**

If you were using a different armature wire, like 3/16", then you would use a 3/16th drill bit. Don't try to use the wrong bit (go out and buy one if you don't have it already) or the armature wire won't fit snug and will wobble and give you problems later on! Another reason you want the wire to fit snug is to avoid gluing it down since you want to be able to remove your sculpture once its done to then place it onto a more permanent base for displaying or for molding purposes.

Using my reference I can continue posing the wire until I'm satisfied (or close enough) the pose I'm after. It is normal to tweak the pose during the clay stages as well, which is why you want to use an armature that is sturdy, yet flexible enough, to allow tweaks as during the clay stage.  
Optional step:

Using Apoxie Sculpt putty (non-toxic epoxy putty made for artists: cures to a rock hard surface in a few hours!) to make bones can be beneficial for sculptors that want to make sure they bend their armature only at specific points (such as a joint).

By locking down the armature with Apoxie Sculpt (or similar putty) your armature will behave much like a real body would and not make spaghetti bends in your work.

I proceed to place it on the wire to act like "bones". I make sure I leave the joints free though because I want to be able to freely tweak the pose during sculpting.

Remember this putty cures to a rock hard finish so there won't be any flexibility where it is placed! This is good because when you are sculpting, and you want to tweak the pose, you will only be able to bend the armature according to the joints (like a real skeleton) because they were left exposed. The last thing you would want to do is to use pliers when you have clay on your piece. The putty takes care of this, as it will only bend at predetermined points!

I continue to putty the figure making sure I don't bulk her up too much (keep it skinny!) or I may find myself with areas of putty poking through the clay. This is true especially for smaller scale female figures (like this one). At 1/4 scale you have a bit more "meat" to work with. As you can see (left) I also made a small ball of putty to serve as a head support. In some cases it may be ideal to make the head removable. All you would have to do is use a piece of brass tubing that fits over the 1/8th wires snugly (but not too tight!). Instead of making the ball of putty on the actual armature wire, you would make it on the brass tube (still following your initial guide of course)

and you would keep the centre armature wire straight. This way you can simply remove the head with ease (just make sure the tubing isn't too tight!).

Once you are done putting all that is left to do is let the material sit and cure (usually a couple of hours depending on the temperature/climate).

If you don't want to wait you can use a heat gun or hair dryer on a LOW setting to speed up the process (a high setting would cause it to bubble and expand or burn!).

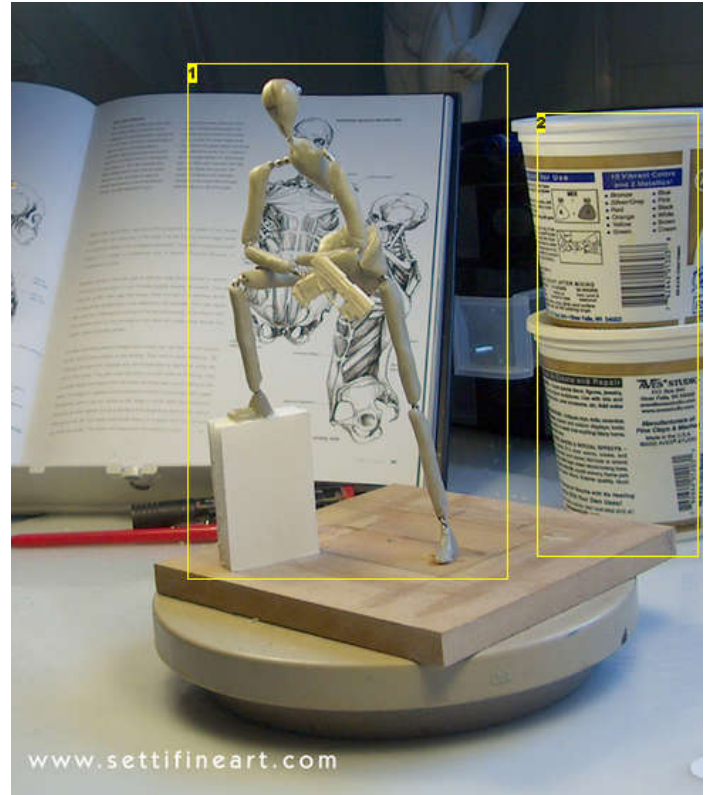
One thing to note is that the putty will become soft when heated and could tend to sag (it gets harder as it cools) so I tend to heat it up in waves allowing it to cool a bit in between...

Well that's about it! Of course this isn't the only way of making an armature, every artist has their own method, but this has worked for me. Of course please feel free to tweak the process so that it works best for you!



#### Image Notes

1. Completed armature with Apoxie putty. The addition of the Apoxie makes this a very sturdy yet flexible armature.



#### Image Notes

1. Armature with putty added and posed after the putty has cured. Note how the major joints are left free of putty to allow the armature to be positioned like the human body would naturally. In this case a hand gun was added so that the hand could be sculpted over it.

2. Apoxie Sculpt by Aves Studio





**Image Notes**  
1. Figure with initial clay build-up.



**Image Notes**  
1. Figure further along. Note the piece of wire sticking out the back of the head to allow for head positioning without deforming the head.

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## Comments

20 comments [Add Comment](#)

**amayer** says:

Can you clarify what gauge wire you are using as the "1/8th aluminum armature wire" and the gauge for the "1/16th aluminum armature wire"?

Also is there a downside to using another type of non-rusting metal wire for the armature ie. brass or copper?

May 5, 2009. 3:42 PM [REPLY](#)

**pumpkinman** says:

amazing musculature. And the face is astounding, for how long have you been doing this?

Apr 23, 2009. 8:41 AM [REPLY](#)



**kiwi\_soccer\_maniac** says:  
Agreed

Apr 23, 2009. 2:59 PM [REPLY](#)



**mg0930mg** says:  
I would like to see a joker or batman one. I think you'd make it look awesome. :)

Apr 23, 2009. 12:04 PM [REPLY](#)



**Kevvixx** says:  
You should make a sculpting tutorial, because that one was great!

Apr 21, 2009. 2:16 PM [REPLY](#)



**Setti Fine Art** says:  
Thank you!

Apr 23, 2009. 6:59 AM [REPLY](#)

I do have a sculpting tutorial in the works but it will take time to compile.... lots of steps lol!



**SinAmos** says:  
Good work.

Apr 22, 2009. 1:46 AM [REPLY](#)



**Setti Fine Art** says:  
Thanks! :)

Apr 23, 2009. 6:59 AM [REPLY](#)



**Tystarr** says:  
So when you're done modeling do you clip the wires off the base to put the figure in a kiln?

Apr 22, 2009. 8:55 AM [REPLY](#)



**Setti Fine Art** says:  
No- I bake it on the base as shown in the pics. I should clarify that super sculpy you use your home oven. It is a polymer clay not a conventional water clay.

Apr 23, 2009. 6:59 AM [REPLY](#)

Most people like to use it for maquette work because after baking it becomes hard and paintable so for a one off you don't need to make a mold and you have something permanent to display.

You can't actually use a wire armature if you were to fire water clay as it would make it crack and explode but it is perfectly fine for baking super sculpy which is done at really low heat in your home oven.



**kool-aid** says:  
awesome

Apr 22, 2009. 11:29 AM [REPLY](#)

where can you find resin?



**Setti Fine Art** says:  
Thanks!

Apr 23, 2009. 6:55 AM [REPLY](#)

I use a resin called SC 320 by smooth-on. You would have to look on their site for a distributor near you. They have silicones as well as other resins to choose from.



**chocha05** says:  
Nice job

Apr 22, 2009. 2:28 PM [REPLY](#)



**Setti Fine Art** says:  
Thank you :)

Apr 23, 2009. 6:55 AM [REPLY](#)



**kenbob** says:  
Excellent instructable, well written and very interesting. You are a great artist.

Apr 22, 2009. 8:13 PM [REPLY](#)



**Setti Fine Art** says:

Thanks so much!

I'm glad you enjoyed it! :D

Apr 23, 2009. 6:54 AM [REPLY](#)



**haloed** says:

Nice Instructible, and nice "Female Figure". Her boobs are too big to be proportionate, but as a guy I don't mine at all. XD

Apr 20, 2009. 9:32 PM [REPLY](#)



**Setti Fine Art** says:

Thanks for the kind words - I didn't design that sculpture. She is a character by Jim Balent called "Tarot: Witch of the Black Rose":  
<http://www.jimbalent.com>

Apr 21, 2009. 10:58 AM [REPLY](#)

I prefer more modest boobs personally...lol! :D

Claudio



**iceprince** says:

Thank you very much!

Your instructional video process made it possible for me to make my first statue. But with this word by word instruction plus other inputs will make my succeeding works to be better and according to the way I want it.

Thank you very much for sharing your talent and knowledge.

Apr 20, 2009. 5:56 AM [REPLY](#)



**Setti Fine Art** says:

My pleasure -I'm glad you found it useful! :D

Claudio

Apr 20, 2009. 10:18 AM [REPLY](#)